OCTOBER 1961 — 37 NO. ST 7
VOLUME 87 PART 2

NEWS OF THE STRUCTURAL DIVISION OF ASCE

Contents

Regulations on Design & Construction of Nuclear Facilities	Pg. 1
Protection Against Radioactive Fallout	Pg. 2
PROGRAM for Structural Division Research Session at October Convention in New York City	Pg. 3
Annual Report of Committee on Electronic Computation	Pg. 4
Book of Tables, Properties of Composite Beam Sections	Pg. 6
To ASCE Members of Chi Epsilon	Pg. 8
New ASCE Transactions Soon to go to Press	Pg. 8
Newsletter Notes	Pg. 9

JOURNAL OF THE STRUCTURAL DIVISION
PROCEEDINGS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

DIVISION ACTIVITIES

STRUCTURAL DIVISION

Proceedings of the American Society of Civil Engineers

NEWS

October, 1961

ABSTRACT OF U. S. ATOMIC ENERGY COMMISSION REGULATIONS GOVERNING THE DESIGN AND CONSTRUCTION ON NUCLEAR FACILITIES

With the advent of private industry's taking over the industrial development of nuclear energy, architect-engineers and consultants must become familiar with the federal rules and regulations governing the design and construction of each nuclear facility.

The Atomic Energy Act of 1954 specifically requires the proper licensing of any individual, company, or corporation who proposes to construct and/or operate any nuclear facility.

There are two classes of licenses granted by AEC - Class 103 and Class 104. A Class 103 license covers facilities for commercial or industrial purposes. A Class 104 license covers facilities for medical therapy and research and development activities.

Prior to the issuance of a license for construction or alteration of a facility, a construction permit must be obtained.

Each application for a license requires specific detailed general and technical information and must be filed in sextuplicate and include wherever appropriate a construction permit. Also, it must contain sufficient information to assure that the proposed facility will meet and satisfy all AEC requirements under law, devoting particular attention to the safeguards required for the benefit of both the licensee and the public. These include containment of radioactivity, controlled waste disposal, both liquid and gas, and all proposed operating procedures.

The AEC gas defined units of radiation and has established regulations governing the permissible "dose." No licensee shall possess, use, or transfer licensed material in such a manner as to cause any individual to be exposed to radiation levels in excess of limits established. These limits are shown in published tables.

Note.—No. 1961-37 is Part 2 of the copyrighted Journal of the Structural Division, Proceedings of the American Society of Civil Engineers, Vol. 87, No. ST 7, October, 1961.
Copyright 1961 by the American Society of Civil Engineers.

With respect to property and liability insurance covering nuclear installations, there has been formed (1) The Nuclear Energy Property Insurance Association for coverage of damages because of bodily injury, sickness or disease (including death), physical injury or destruction or radioactive contamination of property, and loss of use of property so insured; (2) The Nuclear Energy Liability Insurance Association which applies to bodily injury or property damage resulting from nuclear incidents; and (3) Mutual Atomic Energy Reinsurance Pool which operates as a policy-issuing organization for public liability coverage. The amended Atomic Energy Act requires that each licensee have and maintain financial protection of such amounts as the Commission shall require to cover public liability claims. Financial protection is not required with respect to licenses issued for conduct of educational activities to persons found by the Commission to be non-profit educational institutions.

The basic requirements which govern the design, construction, and operation of nuclear facilities are summarized in a report prepared for the Nuclear Structures and Materials Committee, Structural Division, ASCE. Copies of the report may be obtained by contacting the author, Gibson Morris, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Protection Against Radioactive Fallout

A series of workshops on fallout shelters have been given throughout the country and more are being planned. Some are sponsored by the Office of Civil and Defense Mobilization, and more recently are being sponsored by the U. S. Army which has recently been given command of the OCDM. Your Newsletter Editor recently attended one such workshop, a two-day intensive lecture and study course. It was attended by a fairly large group of engineers and architects from the mid-west area. Technical data were distributed and explained in a series of lectures and we were taught by the use of example problems how to evaluate the effectiveness of areas in existing buildings as well as the principles of new design for shelter protection. Important aspects of the entire problem were discussed in a very matter-of-fact manner.

Actually the course was very valuable to those who had fallen into the common belief, popular to the layman, that adequate protection against fallout is impossible and that, in the event of a nuclear attack, very few, if any, of us would survive. This very prevalent misconception is no doubt largely the result of the highly publicized novel and movie entitled "On the Beach." The fact as stated by our instructors is that adequate protection against fallout is quite practical and simple by the use of proper shelters, during a two-week period after a nuclear ground burst. After such an explosion, depending on the distance from it, it is estimated that one would have at least 30 minutes to get to shelter before the dangerous gamma rays in the fallout dust would become damaging. It is obvious, therefore, that two types of shelter are essential: one for the home and one at the place of employment. In addition, of course, shelters should be provided for children at the schools.

It is now realized that complete evacuation of our large cities would be impossible, and therefore the use of shelters is the only defense against loss of life for those who survive the direct blast effects. Residual radiation, or fallout, comprises only 10% of the total energy expenditure of an atomic blast.

Even so, this 10% could result in more damage to the population than the other results of the explosion, since the area affected is 100 times greater. With proper shelters we could save at least 90% of the persons from fallout.

Civil engineers are in a position to play an important part in the design and construction of fallout shelters. Besides the OCDM design manuals, another excellent reference has been called to our attention. It is the new ASCE Manual No. 42 titled "Design of Structures to Resist Nuclear Weapons Effects" prepared by the Committee on Structural Dynamics of the ASCE Engineering Mechanics Division. Price is $2.00 to ASCE members. The manual is for the design of structures which are intended to be resistant in some degree to all of the effects associated with the detonation of a nuclear weapon.

PROGRAM FOR SESSION 4, RESEARCH SESSION

Wednesday Afternoon, October 18, 1961

ASCE Convention, New York City

Presiding: Emerson J. Ruble, Chairman, Executive Committee, Structural Division.

List of Speakers and Subjects:

2:30 PM - G. M. Magee, Director of Engineering Research, Association of American Railroads, Chicago, Illinois
"USE OF EPOXY RESINS IN RAIL JOINT BARS"

2:45 PM - N. W. Hanson, Portland Cement Association, Skokie, Illinois
"TRANSFER OF MOMENT FROM SLABS TO COLUMNS"

3:00 PM - T. H. Hazlett, Dept. of Industrial Engineering, Univ. of California
"FRICTION WELDING OF STEEL"

3:15 PM - J. G. Bouwkamp, Dept. of Civil Engineering, University of California
"THE TESTING OF WELDED STRUCTURAL JOINTS OF A TWO-DIMENSIONAL TRUSS BUILT FROM STEEL TUBES"

3:30 PM - C. P. Siess, Dept. of Civil Engineering, University of Illinois
"HINGE FORMATION IN CONCRETE CONNECTIONS"

3:45 PM - W. H. Munse, Dept. of Civil Engineering, University of Illinois
"THE FATIGUE STRENGTH OF BUTT WELDS IN HIGH STRENGTH STEEL"

4:00 PM - S. J. Errera, Dept. of Civil Engineering, Lehigh University
"THE FATIGUE STRENGTH OF FILLET WELDS IN HIGH STRENGTH STEEL"

4:15 PM - J. R. Janney, Engineers Collaborative, Des Plaines, Illinois
"THE ROLE OF FIELD TESTING IN EVALUATING CONNECTIONS OF PRECAST MEMBERS"

4:30 PM - J. E. Stallmeyer, Dept. of Civil Engineering, University of Illinois
"THE EFFECT OF WELDED STUDS ON THE FATIGUE BEHAVIOR OF PLATES AND BEAMS"

4:45 PM - D. J. Butler - Dept. of Civil Engineering and Engineering Mechanics, Columbia University
"TAPERED BEAMS AND COLUMNS"

5:00 PM - G. W. Washa, Dept. of Engineering Mechanics, University of Wisconsin
"CONCRETE CONNECTIONS"

1960-61 ANNUAL REPORT OF COMMITTEE ON ELECTRONIC COMPUTATION

The Committee on Electronic Computation was reorganized in October 1960, as follows:

Chairman: Sidney Shore
Secretary: Jackson L. Durkee
European Representative: Charles E. Massonnet
ASCE Representative, EJC Information Processing Committee: Frederick R. Klauck

Committee on Conferences: Jerry C. L. Chang*, Chairman; Richard L. Buchwalter*, Frederick A. Reickert, James P. Romualdi*, Lucien A. Schmit, Jr.

Objectives:

(a) Plan and conduct national specialized conferences on applications of computers to structural problems.
(b) Arrange for prompt publication of proceedings of these conferences.
(c) Plan and conduct ASCE convention sessions.

Committee on Publications: John S. Archer*, Chairman; Heinrich W. Bergman, Robert E. Fulton, Richard H. Gallagher, Elwyn H. King, John J. Kozak*, Thomas R. Kuesel, Charles H. Samson, Jr.*

Objectives:

(a) Compile lists of references and prepare summaries on basic mathematical methods and procedures associated with digital computation of structural engineering problems.
(b) Assist the Committee on Publications of the ASCE Structural Division in reviewing papers on digital computation.
(c) Assist convention program committees by reviewing and recommending papers concerned with digital computation for presentation at ASCE meetings.

Committee on Future Applications: Ray W. Clough*, Chairman; Glen V. Berg*, Ray R. Berman, Harold W. Conner, Gordon M. Gray, Robert J. Hansen, John W. Melin**, Nathan M. Newmark*, Charles F. Scheffey.

Objectives:

(a) Investigate and report on procedures not presently being used extensively in structural engineering work, but which seem likely to gain in significance in the future, such as statistical applications, linear-programming applications, and optimization techniques.
(b) Investigate and report on the feasibility of using the computer for scanning and retrieval of source data on structural engineering problems, research, etc, so that the state of knowledge in a particular area could be quickly determined.

* Control group of subcommittee
** Alternate to Nathan M. Newmark as control-group member

Task Committee on Guide for Program Manuals: Gordon P. Fisher*, Chairman; Steven J. Fenves*, Vice-Chairman; Francis E. Swain*, John H. Wells, Charles W. Zahler.

Objectives:

(a) Study the feasibility of preparing a guide that would be of use to structural engineers in preparing manuals describing computer programs.
(b) Make recommendations to the Committee on Electronic Computation regarding future activities in this area.

A summary of what has been accomplished by the Committee on Electronic Computation since October 1960 is as follows:

1. Committee on Conferences

This subcommittee held one meeting, in Pittsburgh, Pennsylvania on 7 April 1961. This meeting was attended by Messrs. Chang, Buchwalter, Reickert, Schmit, and T. Au (representing Mr. Romualdi, and by Messrs. Shore and Durkee.

The main business conducted to date has been making arrangements for the session "A Reappraisal of Analog Computation," scheduled for the ASCE Annual Convention, October 1961 (joint session with Engineering Mechanics Division). In addition, preliminary planning is being done for a seminar-type computer conference, tentatively set for 1963. Present thinking is that this conference should cover only advanced work in the computer field, since the more elementary applications have probably been covered adequately by the Kansas City Conference (November 1958) and the Pittsburgh Conference (September 1960).

As of 8 August 1961, 921 copies of the Kansas City Conference Proceedings have been sold out of an edition of 1000, returning $6142 to the Society, or $3364 more than the direct printing costs of $2778. The Pittsburgh Conference Proceedings are sold out (780 copies), having returned $5000 to the Society, or $533 more than direct printing costs of $4467. A second printing of 400 copies is contemplated for this latter volume, since demand continues at about 30 copies per month.

The next subcommittee meeting is planned for October 1961 at the ASCE Annual Convention in New York.

2. Committee on Publications

One meeting has been held, on 16 June 1961 in Los Angeles, California, attended by Messrs. Archer, Fulton, Kozak, and Samson, and one guest, Mr. Norman B. Jones, from the Structural Engineers' Association of California. Specific action items placed in motion at this meeting are as follows:

(a) Compilation of a list of references and summaries dealing with digital-computer applications to structural engineering;
(b) Selection of a paper on digital computation for presentation at the ASCE Houston Convention, February 1962;
(c) Study of matrix notation, with recommendations as to what standardization may be advisable in connection with ASCE publications; and
(d) Review of four condidate papers for ASCE Journals. One of these has been recommended for publication.

The subcommittee has received and transmitted to the Committee chairman a joint invitation from the Structural Engineers' Association of California and the University of California at Los Angeles to hold the next computer conference in Los Angeles in the spring of 1963.

The next subcommittee meeting is planned for October 1961 at the Annual ASCE Convention in New York.

3. Committee on Future Applications

One subcommittee meeting was held, on 13 April 1961 in Phoenix, Arizona, and attended by Messrs. Clough, Berman, Melin, Conner, and Gray. Studies of the following topics have been initiated and reports will be made at the next subcommittee meeting, to be held in Chicago in October 1961:

(a) The future role of service bureaus in structural engineering;
(b) New techniques in structural design developed specifically for computers, particularly with reference to the problems of structural idealization and mathematical procedures;
(c) Application of optimization techniques to the problem of structural safety;
(d) Evaluation of structural safety using the computer;
(e) Mechanization of information retrieval; and
(f) Use of teaching machines to teach computer programming.

It was suggested that the next computer conference be held at Denver or Colorado Springs, in the spring of 1963.

4. Task Committee on Guide for Program Manuals

No meetings of this task committee have been held to date. The chairman reports that the preparation of material for the guide is underway, and that this material will be reviewed at the coming task-committee meeting, planned for New York during the ASCE Annual Convention in October 1961. A decision as to the advisability of going ahead with the guide will be reached at this meeting.

Jackson L. Durkee, Secretary
Committee on Electronic Computation

Bethlehem Steel Company
Fabricated Steel Construction
Bethlehem, Penna.

28 August 1961

BOOK OF TABLES OF PROPERTIES OF COMPOSITE BEAM SECTIONS

The following table shows the subscription price per bound copy of Tables of Properties of Composite Beam Sections, which the author has programmed and is planning to compute on a high speed digital computer. Insufficient demand for this type of tables may prevent the author in printing them. However, as a service to the profession, Consulting Engineers and other persons interested in Composite Beam Design may acquire copies printed directly from the computer tape, according to the schedule shown. The high price per

copy for low demand, is reflected by spreading the cost of computation over fewer copies, and also the relative high cost of printing from tape.

Subscription price is offerd on a non-profit basis as listed, and assumes a printing on 3 part paper (original plus two very legible carbons), and are predicated on the willingness of a subscriber to accept a carbon copy. Thus, two out of three subscribers will receive carbon copies. The programming costs, computer time spent to assemble the program and obtaining intermediate results for testing it have been absorbed by the author. Author retains copyright rights for this work.

Subscribers should advise when placing their enquiry what is the maximum price they are willing to pay for a set of tables. The higher price they are willing to pay, the more likely they will obtain a copy. However, if demand is larger than at the selected price bracket, they will be billed at the price shown opposite the actual demand bracket.

Total demand	Cost per copy
3	$93.50
6	55.40
9	42.60
12	36.20
15	32.30
18	29.80
21	28.00
24	27.00
28 and over	26.00

The Tables will list the following properties of composite beam sections for 4 inch, $4\frac{1}{2}$ inch, 5 inch and $5\frac{1}{2}$ inch slab thickness, with width of slab ranging from 30 inches to 100 inches at 5 inches interval:

Moment of Inertia of Composite Section.
Section Moduli for top and bottom steel.
Ratio of Statical Moment to Moment of Inertia of composite section (for spacing shear connectors).

The tables will consist of 4 sets of tables for modular ratios of 10, 12, 20 & 24. 150 to 180 Steel Wide Flange beam sections (with or without bottom flange plate) will be treated, resulting in a book of 200 to 240 pages. A limited number of sample tables is available for the asking. Inquiries should be directed to:

Saby Eliachar, Consulting Engineer
15 Rockford Avenue, Daly City, California

TO ASCE MEMBERS OF CHI EPSILON

Chi Epsilon Fraternity, national civil engineering honor society, has officially offered to supply the funds necessary to furnish a formal Conference Room at the United Engineering Center. This room will be on the ASCE executive floor, will be named "The Chi Epsilon Room," and will be available for conference and committee meetings.

Pledges are not expected, but single voluntary gifts, from members and friends of the Fraternity are earnestly solicited. An attractive Commemoration Book has been planned in which donors of $100 or more (singly or in groups) may inscribe the name of a revered person.

On request, the national chairman, Samuel Kramer (8701 Shore Road, Brooklyn 9, New York) will be glad to mail a descriptive brochure. Your gift is tax deductible if you make your check out to "ASCE CHI EPSILON ROOM FUND" and mail it to Mr. Donald D. King, ASCE, 345 East 47th Street, New York 17, N. Y. Your gift will be automatically credited to the quota of your initiating Chapter. The national goal is $10,000; as of September 12, $7,504 has been collected.

NEW ASCE TRANSACTIONS SOON TO GO TO PRESS

In mid-May all Society members received a brochure describing the revamping that the TRANSACTIONS are undergoing. Since that time thousands of orders have been received, but still more should have reached us.

Beginning with Volume 126 (1961), TRANSACTIONS will be issued as a standard set of five parts, containing all Division Journal papers, according to the following schedule:

Part I	Engineering Mechanics, Hydraulics, Soil Mechanics and Foundations
Part II	Construction, Structural
Part III	Irrigation and Drainage, Power, Sanitary Engineering
Part IV	Air Transport, City Planning, Highway, Pipeline, Surveying and Mapping, Waterways and Harbors
Part V	Professional Practice

Members of ASCE can enter standing orders to any one, or more, of Parts I through IV at $3.50 each per year; the price for Part V will be $2.00 per year. Members can effect a considerable saving by subscribing to all five parts—the total price of $16.00 is reduced to $10.00.

Part V is reserved for the papers published in the Journal of Professional Practice, which is of interest to all members, regardless of their technical specialties. Part V will also contain the President's Annual Address, abstracts of the memoirs of deceased members, Final Reports of Committees in the Department of Conditions of Practice, and combined subject and author indexes for Parts I through V.

A single binding has been selected, more attractive and durable than the paper, cloth, and morocco-grained covers used in the past. This binding will be in the Society's official Royal Blue, composed of cloth impregnated with vinyl. The spine will contain horizontal rules to match those used previously on the morocco-grained volumes. The binding and gold stamping will resist fading and will not deteriorate in warm, moist climates.

The TRANSACTIONS will be mailed in December of each year and the bills will be sent out at that time.

Please use the following coupon to place your order. Do not send in a coupon if you previously mailed the original order card.

----------CUT HERE----------

Please enter my standing order for the New ASCE TRANSACTIONS (beginning with Vol. 126, 1961) as follows (Do not prepay):

	ASCE members		Additional member orders	
Part I	_____	@ $ 3.50	_____	@ $ 7.00
Part II	_____	@ $ 3.50	_____	@ $ 7.00
Part III	_____	@ $ 3.50	_____	@ $ 7.00
Part IV	_____	@ $ 3.50	_____	@ $ 7.00
Part V	_____	@ $ 2.00	_____	@ $ 4.00
Parts I thru V	_____	@ $10.00	_____	@ $20.00

Signature: _____

My ASCE membership grade is _____.

_____
Name (Please Print)

_____
Mailing Address

_____

_____
City Zone State

NEWSLETTER NOTES

This NEWSLETTER is published on a bi-monthly basis provided that sufficient material is on hand. The next issue will be for December if enough news is received by October 30th. Reader comment, committee reports, new committee appointments, notices of committee decisions, and informal news items are welcomed for inclusion in the NEWSLETTER. Contribution should be addressed to:

Frank Randall, Newsletter Editor
c/o P. C. A.
111 W. Washington St.
Chicago 2, Illinois

ASCE MANUAL NO. 41—PLASTIC DESIGN IN STEEL

The evaluation of a considerable amount of research work has demonstrated the applicability of plastic analysis to structural design. For the type of structure to which its application is intended, plastic design results in an overall balanced design, and a more economical use of material than conventional methods. In comparison with allowable stress ("elastic") design methods, plastic design is a simpler design technique. As a consequence, designers have chosen the plastic design method for more than 2,000 structures built in the United States and abroad.

The most-recent addition to the series of ASCE Manuals of Engineering Practice is a "Commentary on Plastic Design in Steel." This Manual is the result of a joint effort of a committee from the Welding Research Council and the Engineering Mechanics Division of ASCE. Although much of the experimental and theoretical work was performed at Lehigh University, the joint committee has broadened this Commentary by including the results of research at other institutions, both in the United States and abroad.

The list price is $7.00; ASCE members and public and school libraries will pay $3.50. This Manual is available in either cloth binding or in paper covers; there is no differential in cost.

----------CUT HERE----------

American Society of Civil Engineers
United Engineering Center
345 East 47th Street
New York 17, New York

Please send me. . . . . .copy(s) of ASCE MANUAL 41. Enclosed is my remittance of $. . . . . My ASCE membership grade is . . . . . List price, $7.00; ASCE members and public and school libraries, $3.50.

Check one: Cloth bound . . . . Paper bound . . . .

_____
(Name)

_____
(Address)

_____
(City) (Zone) (State)

. . . M 41 . . .

ASCE MANUAL NO. 42—DESIGN OF STRUCTURES TO RESIST NUCLEAR WEAPONS EFFECTS

As a project of the Committee on Structural Dynamics of the Engineering Mechanics Division, through its Manual Subcommittee this Manual (No. 42) has been in preparation for several years. It was written for use of the engineering profession in the design of structures which are intended to be resistant in some degree to all of the effects associated with the detonation of a nuclear weapon. Copies of this paper-bound Manual can be obtained by completing the accompanying coupon. The list price is $4.00 and ASCE members are entitled to a 50% discount.

---------- CUT HERE ----------

American Society of Civil Engineers
United Engineering Center
345 East 47th Street
New York 17, New York

Please send me_____copies of Manual 42, Enclosed is my remittance of $_____. My ASCE membership grade is_____.

Name_____
(print Name)

Street_____

City_____Zone_____State_____

M42

PAPERS FROM THE 2nd CONFERENCE ON ELECTRONIC COMPUTATION

The papers presented at the 2nd Conference on Electronic Computation in Pittsburgh, September 8-9, 1960, are being offered in a single hard-bound volume. This special edition is composed of the thirty two technical papers, the welcome address, keynote address and three luncheon addresses, all as delivered at the Conference. The price (post-paid) is as follows:

	Members	Non Members
Cost per copy	$6.50	$13.00

If you wish to order a copy of this publication please use the attached order form.

---------- CUT HERE ----------

American Society of Civil Engineers
United Engineering Center
345 East 47th Street
New York 17, New York

Name_____
(Please Print)

Please send_____copy(s) of the 2nd Conference on Electronic Computation papers.

Address_____

City_____Zone___State_____

I am____I am not____a member of ASCE. The amount enclosed is $_____

2nd CP